IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

NORTH STAR INNOVATIONS, INC., Plaintiff,	)	
v.	)	C.A. No.: ________________
MICRON TECHNOLOGY, INC., Defendant.	)	**JURY TRIAL DEMANDED**

COMPLAINT FOR PATENT INFRINGEMENT

North Star Innovations, Inc. ("North Star"), by and through its attorneys, files this Complaint for Patent Infringement against Defendant, Micron Technology, Inc. ("Micron"), and avers as follows:

PARTIES

1. North Star is a corporation organized and existing under the laws of Delaware, with its principal place of business located at 600 Anton Blvd., Suite 1350, Costa Mesa, CA 92626, and further having a registered office at 2711 Centerville Road, Suite 400, Wilmington, Delaware 19808. North Star is the owner, through assignment, of the entire right, title and interest in the following patents: U.S. Patent No. 7,171,526, entitled "MEMORY CONTROLLER USEABLE IN A DATA PROCESSING SYSTEM" ("the '526 Patent"); U.S. Patent No. 6,465,743, entitled "MULTI-STRAND SUBSTRATE FOR BALL-GRID ARRAY ASSEMBLIES AND METHOD" ("the '743 Patent"); U.S. Patent No. 6,127,875, entitled "COMPLIMENTARY DOUBLE PUMPING VOLTAGE BOOST CONVERTER" ("the '875 Patent"); and U.S. Patent No. 5,943,274, entitled "METHOD AND APPARATUS FOR AMPLYING A SIGNAL TO PRODUCE A LATCHED DIGITAL SIGNAL" ("the '274 Patent") (collectively referred to herein

as the “Patents-in-Suit”).

2. Micron is a corporation incorporated under the laws of Delaware, having its principal place of business at 8000 South Federal Way, Boise, ID 83707. Micron’s registered agent for service of process is Corporation Service Company, 2711 Centerville Road, Suite 400, Wilmington DE 19808.

3. At all times relevant to this action, Micron has been engaged in the business of manufacturing, using, offering for sale and selling in the United States, and importing into the United States, memory devices that infringe the Patents-in-Suit.

JURISDICTION AND VENUE

4. This action arises under the patent laws of the United States, 35 U.S.C. §§ 1 et seq. This Court has subject matter jurisdiction over this action pursuant to 28 U.S.C. §§ 1331 and § 1338(a).

5. This Court has personal jurisdiction over Defendant in this district, in that Defendant, directly or through its agents, is a resident of, and/or has regularly conducted business activities in this district; has committed infringing activities in this district by manufacturing, using, marketing, offering for sale, selling and importing products and systems that infringe the Patents-in-Suit; and has placed products that infringe the Patents-in-Suit in the stream of commerce with the knowledge and intent that they would be used, offered for sale and sold by others in this district.

6. Venue is proper pursuant to 28 U.S.C. §§ 1391(b) and 1400(b).

THE PATENTS-IN-SUIT - GENERAL ALLEGATIONS

7. The ‘526 Patent was duly and legally issued by the United States Patent and Trademark Office (“USPTO”) on January 30, 2007, naming Arnaldo R. Cruz as inventor, and

Freescale Semiconductor, Inc., as assignee. The ‘526 Patent relates to a memory controller useable in a data processing system. A true and correct copy of the ‘526 Patent is attached as Exhibit “A” hereto.

8. The ‘743 Patent was duly and legally issued by the USPTO on October 15, 2002, naming Norman Lee Owens as inventor, and Motorola, Inc., as assignee. The ‘743 Patent relates to a method for manufacturing BGA package integrated circuit devices. A true and correct copy of the ‘743 Patent is attached as Exhibit “B” hereto.

9. The ‘875 Patent was duly and legally issued by the USPTO on October 3, 2000, naming Steven Peter Allen, Ahmad H. Artiss, Gerald Lee Walcott and Walter C. Seelbach as inventors, and Motorola, Inc., as assignee. The ‘875 Patent relates to a voltage boosting circuit that provides an output voltage greater than the supplied input voltage. A true and correct copy of the ‘875 Patent is attached as Exhibit “C” hereto.

10. The ‘274 Patent was duly and legally issued by the USPTO on August 24, 1999, naming Alan S. Roth and Scott G. Nogle as inventors, and Motorola, Inc., as assignee. The ‘274 Patent relates to an apparatus and method for amplifying a signal to produce a latched digital signal in a memory integrated circuit. A true and correct copy of the ‘274 Patent is attached as Exhibit “D” hereto.

11. The Patents-in-Suit were all ultimately assigned to North Star, and North Star is the exclusive and current owner of all rights, title and interest in the Patents-in-Suit, and is entitled to enforce the Patents-in-Suit against infringers, including by commencing the present action.

12. As set forth more fully below, Micron has engaged and continues to engage in acts of infringement under 35 U.S.C. § 271, *inter alia*, by using, offering for sale and selling in

the United States, and importing into the United States, various memory devices that infringe at least one claim of one or more of the Patents-in-Suit, either literally or under the doctrine of equivalents.

13. Micron does not have a license or other authorization to practice the claims set forth in the Patents-in-Suit.

COUNT I- CLAIM FOR PATENT INFRINGEMENT OF U.S. PATENT NO. 7,171,526

14. North Star incorporates by reference and in their entirety the averments set forth in paragraphs 1 through 13, inclusive, of this Complaint.

15. On information and belief, Micron has engaged and continues to engage in acts of infringement under 35 U.S.C. § 271, *inter alia,* by using, offering for sale and selling in the United States, and importing into the United States, data processing systems, including, without limitation, solid state storage devices ("SSDs"), that embody each element of at least one claim of the '526 Patent.

16. By way of example only, one of the infringing products that Micron has specifically used, offered for sale and sold in the United States, and imported into the United States for sale, and continues to use, offer for sale and sell in the United States, and import into the United States for sale, is the Micron 9100 PRO PCle NVMe SSD, that includes the PMC-Sierra 89HF16P04CG3 memory controller.

17. More specifically, the Micron 9100 PRO PCle NVMe SSD includes a system bus used to transfer data or other information.

18. The PMC-Sierra 89HF16P04CG3 memory controller that is included within the Micron 9100 PRO PCle NVMe SSD includes a system bus master that is coupled to the system bus, and that controls the transfer of data or other information via the system bus.

19. The PMC-Sierra 89HF16P04CG3 memory controller that is included within the Micron 9100 PRO PCle NVMe SSD includes a NAND flash memory controller that is coupled to the system bus, and that controls the NAND flash memory that is included within the Micron 9100 PRO PCle NVMe SSD.

20. The PMC-Sierra 89HF16P04CG3 memory controller that is included within the Micron 9100 PRO PCle NVMe SSD further includes a DRAM controller that is coupled to the system bus, and that controls the DRAM that is included within the Micron 9100 PRO PCle NVMe SSD.

21. The PMC-Sierra 89HF16P04CG3 memory controller that is included within the Micron 9100 PRO PCle NVMe SSD further includes a buffer manager that is connected to the DRAM controller and that includes arbitration logic for arbitrating between the system bus master and the NAND flash memory controller for access to data buffered in the DRAM.

22. The PMC-Sierra 89HF16P04CG3 memory controller further includes a memory controller bus that operates independently of the system bus, that is coupled to both the NAND flash memory controller and the DRAM controller, and that controls the transfer of data between the NAND flash memory controller and the DRAM controller.

23. Accordingly, the Micron 9100 PRO PCle NVMe SSD, including the PMC-Sierra 89HF16P04CG3 memory controller, embodies all of the elements of, and therefore infringes, at least Claim 15 of the ‘526 Patent.

COUNT II- CLAIM FOR PATENT INFRINGEMENT OF U.S. PATENT NO. 6,465,743

24. North Star incorporates by reference and in their entirety the averments set forth in paragraphs 1 through 13, inclusive, of this Complaint.

25. On information and belief, Micron has engaged and continues to engage in acts of infringement under 35 U.S.C. § 271, *inter alia*, by using, offering for sale and selling in the United States, and importing into the United States, memory devices that consist of, or include, BGA package integrated circuit devices that are made according to a method that embodies each element of at least one claim of the '743 Patent.

26. By way of example only, Micron has specifically used, offered for sale and sold in the United States, and imported into the United States for sale, and continues to use, offer for sale and sell in the United States, and import into the United States for sale, the Micron 1Tb TLC 3D NAND Flash device, that is included, for example, in the Micron Crucial® MX300 525GB SSD.

27. More specifically, the Micron 1Tb TLC 3D NAND Flash device consists of a BGA package integrated circuit device that is assembled by a method that provides multiple BGA substrates arranged in an array within a printed circuit board, wherein each of the BGA substrates includes bond posts on one side of the substrate and contact pads on the other side of the substrate.

28. The method by which the Micron 1Tb TLC 3D NAND Flash device is assembled further includes attaching a semiconductor die to each of the BGA substrates, with each semiconductor die including a plurality of bond pads.

29. The method by which the Micron 1Tb TLC 3D NAND Flash device is assembled further includes encapsulating each semiconductor die with an encapsulant material that is cured to form a solid material to protect the semiconductor die. Conductive solder balls are attached to each of the contact pads on the one side of each substrate.

30. The method by which the Micron 1Tb TLC 3D NAND Flash device is assembled further includes dividing the array into separate substantially planar BGA packages.

31. Accordingly, the Micron 1Tb TLC 3D NAND Flash device, and the Crucial® MX300 525GB SSD that includes the Micron 1Tb TLC 3D NAND Flash device, are assembled according to a method that embodies all of the elements of, and therefore infringe, at least Claim 1 of the ‘743 Patent.

COUNT III- CLAIM FOR PATENT INFRINGEMENT OF U.S. PATENT NO. 6,127,875

32. North Star incorporates by reference and in their entirety the averments set forth in paragraphs 1 through 13, inclusive, of this Complaint.

33. On information and belief, Micron has engaged and continues to engage in acts of infringement under 35 U.S.C. § 271, *inter alia,* by using, offering for sale and selling in the United States, and importing into the United States, memory devices, including, without limitation, NAND Flash memory devices and SDRAM devices, that embody each element of at least one claim of the ‘875 Patent.

34. By way of example only, Micron has specifically used, offered for sale and sold in the United States, and imported into the United States for sale, and continues to use, offer for sale and sell in the United States, and import into the United States for sale, the Micron 96 GB TLC 3D NAND Flash device, that is included, for example, in the Micron Crucial® MX300 750GB SSD.

35. More specifically, the Micron 96 GB TLC 3D NAND Flash device includes a charge pump circuit that includes an input terminal to receive a supply voltage, and an output terminal that provides a boosted output voltage.

36. The charge pump circuit further includes a first switch and a first capacitor.

37. The first switch in the charge pump circuit is coupled between the input terminal and the output terminal, and is operated by a signal having a first phase.

38. The first capacitor in the charge pump circuit has a first terminal coupled to the output terminal, and a second terminal coupled to receive a boost signal.

39. The charge pump circuit further includes a second switch and a second capacitor.

40. The second switch in the charge pump circuit is coupled between the input terminal and the output terminal, and is operated by a signal having a second phase that is opposite to the first phase.

41. The second capacitor in the charge pump circuit has a first terminal coupled to the output terminal, and a second terminal coupled to receive the boost signal.

42. Accordingly, the Micron 96 GB TLC 3D NAND Flash device, and the Crucial® MX300 750 GB SSD that includes the Micron 96 GB TLC 3D NAND Flash device, embody all of the elements of, and therefore infringe, at least Claim 1 of the '875 Patent.

43. By way of further example, Micron has specifically used, offered for sale and sold in the United States, and imported into the United States for sale, and continues to use, offer for sale and sell in the United States, and import into the United States for sale, the Micron 4 Gb DDR4 SDRAM device, that is included, for example, in the Micron Crucial 4GB DDR4-2133 SODIMM.

44. More specifically, the Micron 4 Gb DDR4 SDRAM device includes a charge pump circuit that includes an input terminal to receive a supply voltage, and an output terminal that provides a boosted output voltage.

45. The charge pump circuit further includes a first switch and a first capacitor.

46. The first switch in the charge pump circuit is coupled between the input terminal and the output terminal, and is operated by a signal having a first phase.

47. The first capacitor in the charge pump circuit has a first terminal coupled to the output terminal, and a second terminal coupled to receive a boost signal.

48. The charge pump circuit further includes a second switch and a second capacitor.

49. The second switch in the charge pump circuit is coupled between the input terminal and the output terminal, and is operated by a signal having a second phase that is opposite to the first phase.

50. The second capacitor in the charge pump circuit has a first terminal coupled to the output terminal, and a second terminal coupled to receive the boost signal.

51. Accordingly, the Micron 4 Gb DDR4 SDRAM device, and the Micron Crucial 4GB DDR4-2133 SODIMM that includes the Micron 4 Gb DDR4 SDRAM device, embody all of the elements of, and therefore infringe, at least Claim 1 of the ‘875 Patent.

COUNT IV- CLAIM FOR PATENT INFRINGEMENT OF U.S. PATENT NO. 5,943,274

52. North Star incorporates by reference and in their entirety the averments set forth in paragraphs 1 through 13, inclusive, of this Complaint.

53. On information and belief, Micron has engaged and continues to engage in acts of infringement under 35 U.S.C. § 271, *inter alia,* by using, offering for sale and selling in the United States, and importing into the United States, memory devices, including, without limitation, SDRAM devices, that embody each element of at least one claim of the ‘274 Patent.

54. By way of example only, Micron has specifically used, offered for sale and sold in the United States, and imported into the United States for sale, and continues to use, offer for sale and sell in the United States, and import into the United States for sale, the Micron 4 Gb

DDR4 SDRAM device, that is included, for example, in the Micron Crucial 4GB DDR4-2133 SODIMM.

55. More specifically, the Micron 4 Gb DDR4 SDRAM device is a memory device that includes a memory array for storing data, and an output stage coupled to the memory array.

56. The output stage of the Micron 4 Gb DDR4 SDRAM device is structured to generate appropriate logic level output signals from the memory device that are based on data stored in the memory array.

57. The output stage further includes timing circuitry, a differential amplifier, impedance control circuitry, a level converter circuit, and a clock-free latch circuit.

58. The differential amplifier of the Micron 4 Gb DDR4 SDRAM device is coupled to, and responsive to, the timing circuitry.

59. The level converter circuit of the Micron 4 Gb DDR4 SDRAM device is coupled to, and responsive to, both the differential amplifier and the impedance control circuitry.

60. The clock-free latch circuit of the Micron 4 Gb DDR4 SDRAM device is coupled to, and responsive to, the level converter circuit.

61. Accordingly, the Micron 4 Gb DDR4 SDRAM device, and the Micron Crucial 4GB DDR4-2133 SODIMM that includes the Micron 4 Gb DDR4 SDRAM device, embody all of the elements of, and therefore infringe, at least Claim 1 of the ‘274 Patent.

DAMAGES

62. North Star incorporates by reference and in their entirety the averments set forth in paragraphs 1 through 61, inclusive, of this Complaint.

63. Micron has caused and will continue to cause North Star substantial damage by virtue of its infringing activities.

64. North Star is entitled to recover from Micron the damages it has sustained as a result of Micron's infringing activities.

DEMAND FOR JURY TRIAL

65. North Star hereby demands a trial by jury of all issues triable of right before a jury.

PRAYER FOR RELIEF

WHEREFORE, North Star respectfully requests the following relief:

a) That this Court enter judgment in favor of North Star and against Micron that Micron has infringed the Patents-in-Suit;

b) That this Court award North Star all damages adequate to compensate North Star for the harm it has suffered as a result of Micron's infringement of the Patents-in-Suit, but in no event less than a reasonable royalty, together with pre- and post-judgment interest and costs as fixed by the Court, all pursuant to 35 U.S.C. § 284;

c) In the event that evidence is adduced through discovery or at trial that Micron's infringement was willful and deliberate, that this Court award North Star enhanced damages pursuant to 35 U.S.C. § 284;

d) In the event that circumstances warrant a declaration that this case be declared to be exceptional, that this Court award North Star its reasonable attorneys' fees pursuant to 35 U.S.C. § 285; and

e) That this Court award to North Star such other and further relief as this Court deems to be just and proper.

Dated: May 3, 2017

Respectfully submitted,

FARNAN LLP

/s/ Brian E. Farnan

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